

Armoured brain: a case of bilateral calcified chronic subdural haematoma complicating infantile hydrocephalus

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Abstract

Chronic Subdural haematoma is one of the late complications of shunting procedures. Calcified Chronic Subdural haematoma (CCSDH) which is very rare, follows untreated or asymptomatic Chronic subdural haematomas. When it occurs bilaterally it gives the typical appearance of an “armoured brain” also known as “Matrioska head”.

The authors present a case of bilateral CCSDH found on follow-up CT brain scan 15 years after the shunt procedure. The parents had objected to surgical drainage at the time the initial diagnosis was made. The patient is neurologically stable with functional ventriculoperitoneal shunt.

The discussion includes a review of relevant literature and treatment options.

Keywords: Armoured Brain, Calcified Chronic Subdural haematoma, infantile hydrocephalus, complications of shunts

Introduction

Chronic Subdural haematomas (CSDH) is one of the late complications of shunting procedures for infantile hydrocephalus (5, 9, 15, 17). Calcified Chronic Subdural Hematoma (CCSDH) is a rare condition and when it occurs bilaterally, may give the

appearance of “armoured brain” (5, 12, 20) or “Matrioska Head” (18). The authors present a case of bilateral CCSDH in a 16 yr old male with epilepsy following a shunt procedure for infantile hydrocephalus.

Case report

AA is a 16 yr old male (DOB 24/7/1993) who was first seen at 3 months of age and treated for severe post-meningitic hydrocephalus by a ventriculoperitoneal (VP) Shunt. There was also an associated seizure disorder which was controlled with antiepileptic drugs. He had a shunt revision surgery in June 1999. He had features of delayed milestone. A follow-up Computerized Tomography (CT) brain scan done in September 2006 showed a bilateral chronic subdural haematoma. The ventricles were normal in size and the ventricular catheter was in place. Patient was essentially asymptomatic with good control of seizures. An evacuation of the CSDH was planned but the parents absconded and patient was temporarily lost to follow-up. Patient returned to the hospital in March 2010 and a repeat CT brain scan was performed which revealed a bilateral calcified Chronic subdural haematoma; the ventricular size appeared normal with no evidence of active

hydrocephalus. The ventricular catheter was in the ventricle but shows evidence of inward migration (Figure 1). We elected to continue observation of this patient as there was no acute neurological deterioration.

Discussion

Chronic subdural hematoma is one of the late complications of shunting for infantile hydrocephalus. The risk of post-shunting subdural hematomas in children ranges from 2.8 to 5.4% (17). Calcified CSDH is rare and when it occurs bilaterally may give the typical appearance of an “armoured brain” so-called because the calcified subdural collection appears as “bone under bone” or “double skull” on Computerized Tomographic (CT) scan (Figure 2), as if a shell or carapace is encasing the brain (2, 12). Sgaramella et al had used the term “Matrioska head” to describe the same condition (18). CCSDH is seen more in children but has been reported in adults also (2, 6, 8, 16, 22). The reported frequency of radiologically demonstrable CCSDH ranges from 0.3 to 2.7% (11, 14, 22). The degree of calcification varies from thin rim of calcified membrane to dense calcification of the hematoma (8), and rarely ossification of the hematoma (1, 4, 11, 21).

Subdural hematomas occur possibly due to over-drainage of the ventricles especially in patients whose cranial sutures have fused but the pathogenesis and mechanisms of calcification are still debatable. There has been no record of this complication in patients who were treated with endoscopic third ventriculostomy. Etiological factors considered include poor circulation, delayed haematoma absorption and stagnation, leading ultimately to calcification (14).



Figure 1 A non-contrast CT Brain scan of the patient showing bilateral calcified subdural haematoma. The ventricles appear normal in size. The ventricular catheter appears insitu with evidence of minimal migration

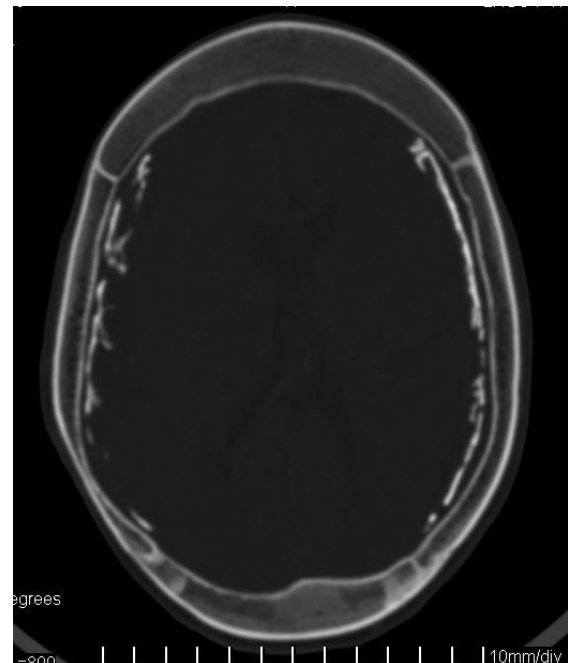


Figure 2 The bone window of the same CT scan shows “bone in bone” or “double skull” appearance as a result of the calcified haematoma

Others have suggested that metabolic anomalies may also play a role (1, 19). Central to these factors is time: a subdural haematoma that is not diagnosed or not drained in time and not completely resorbed will ultimately undergo calcification. This was the case in this patient whose parents objected to surgical evacuation and absconded, now returning with CCSDH.

Many cases of CCSDH are asymptomatic (7, 10, 11, 14), presenting as a radiological surprise in otherwise normal patients undergoing routine follow-up investigation. Clinical presentations vary and include chronic headaches, new-onset or worsening seizures, dysphasia, mental retardation, deteriorating vision, paresis, gait disturbance and altered sensorium (1-3, 6, 19, 24). It has been suggested that the presence of brain atrophy may have been the reason why some cases are asymptomatic (13, 14). A CT brain scan is adequate for diagnosis and is preferred (12), though Magnetic resonance imaging (MRI) has been used to describe the features (16, 23).

Our patient was managed as post-infective hydrocephalus with seizures over 15 years ago and is presently on anti-epileptic drugs with good control, the shunt is functional and appears within normal sized ventricles with no evidence of active hydrocephalus (Figure 1). We have chosen to follow him up closely.

Surgical excision though feasible could be very tasking and is considered in symptomatic patients with acute or progressive neurological deficits and seizures not adequately controlled with antiepileptic drug (2, 6, 16, 24), but some authors have surgically removed asymptomatic CCSDH (14). There is also a

risk of damage to underlying brain tissue (6, 16). When shunt revision becomes necessary, a new access point may have to be used and the previous ventricular catheter which may be encased in the calcified hematoma, is left insitu (15).

Conclusion

Calcified chronic subdural hematomas are rare complications of shunting, whose management is based on the clinical status of the individual patient. Interval CT scans during the long-term follow-up of these patients will detect asymptomatic chronic subdural hematomas that can be treated early to forestall calcification. Surgical excision is feasible but should be limited to symptomatic cases.

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